

Abstract

Cannulas are provided for delivering therapeutic material to a treatment site. The cannula includes a cannula body with a plurality of openings at the distal end, including a longitudinal opening and a plurality of transverse openings that are axially spaced from each other. The 5 cannula also includes a plunger that is configured to be slidably disposed within the cannula lumen. When the plunger is proximally displaced in the cannula lumen, the plunger seals the distal end and deflects the therapeutic material out the transverse openings. As the plunger is proximally displaced within the lumen, the therapeutic material is forced to perfuse out transverse openings located proximal of the plunger position. In one embodiment, the plunger 10 includes an additional pliable sealable member. In another embodiment, the distal end of the cannula body may be implanted by separating the distal end from the cannula body.